WHAT IS CLAIMED IS:

1. A polycrystalline diamond material formed by sintering diamond crystals doped with an additive at sufficient temperature and pressure for forming polycrystalline diamond.

2. The polycrystalline diamond material as in claim 1 wherein the additive is selected from the group of additives consisting of Be, Li and Al.

3. The polycrystalline diamond material as in claim 1, wherein said polycrystalline diamond material is characterized as being a semiconductive material.

4. The polycrystalline diamond material as in claim 1, wherein said polycrystalline diamond material is characterized as being a P-type semiconductive material.

5. The polycrystalline diamond material as in claim 1, in which said polycrystalline diamond material has a resistance of no greater than 10 ohms.

6. The polycrystalline diamond material as in claim 1, wherein said polycrystalline diamond material has a resistance being less than 10% of a corresponding resistance of a substantially similar polycrystalline diamond material formed substantially only of Type I diamonds.

7. The polycrystalline diamond material as in claim 1, wherein said polycrystalline diamond material has a thermal conductivity being about 15 times greater than a corresponding thermal conductivity of a substantially similar

polycrystalline diamond material formed substantially only of Type I diamond crystals, at 80°K.

8. The polycrystalline diamond material as in claim 1, in which said polycrystalline diamond material is substantially void of any metal binder material and has a resistance no greater than 1000 ohms.

9. A cutting element comprising the polycrystalline diamond material as in claim 1, formed over a substrate.

10. A polycrystalline diamond material formed by sintering Type I diamond crystals at sufficient temperature and pressure for forming polycrystalline diamond, wherein after sintering a plurality of said Type I diamond crystals comprising a semiconductive surface layer.

11. The polycrystalline diamond material as in claim 10, in which said polycrystalline diamond material further includes impurity species therein, said impurity species selected from the group consisting of Li, Be, B, and Al.

12. The polycrystalline diamond material as in claim 10, in which said semiconductive surface layers include impurity species therein, said impurity species selected from the group consisting of Li, Be, B, and Al.

13. The polycrystalline diamond material as in claim 10, wherein said polycrystalline diamond material is a P-type semiconductive material.

14. The polycrystalline diamond material as in claim 10,

wherein said polycrystalline diamond material has a resistance no greater than 50 ohms.

15. The polycrystalline diamond material as in claim 14, further comprising a metal binder therein at a weight percentage no greater than 10 percent.

16. The polycrystalline diamond material as in claim 10, wherein said polycrystalline diamond material is substantially void of any metal binder material and has a resistance of no greater than 1000 ohms.

17. A cutting element comprising the polycrystalline diamond material as in claim 10, formed over a substrate.

18. A drill bit comprising a cutting element comprising a substrate and a polycrystalline diamond layer over said substrate, said polycrystalline diamond layer comprising Type I diamond crystals therein, a plurality of said Type I diamond crystals comprising a semiconductive surface layer.

19. A drill bit as in claim 18 wherein the polycrystalline diamond is formed by sintering Type I diamond crystals at a sufficient temperature and pressure for forming polycrystalline diamond.

20. A drill bit comprising a cutting element comprising a substrate and a polycrystalline diamond layer over said substrate, said polycrystalline diamond layer formed by converting diamond crystals doped with a doping additive to polycrystalline diamond.

21. A drill bit as is claim 20 wherein the additive is selected from the group of additives consisting of lithium, beryllium and aluminum.

22. A drill bit as recited in claim 20 wherein the said diamond crystals are converted to polycrystalline diamond by sintering.